Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A disk drive, ~~drive~~ comprising:

a magnetic disk having an annular data storage region between inner and outer diameters; and

an actuator arm assembly including an actuator arm, a flexure arm mounted on ~~to~~ a first end of said actuator arm, and a read element and a write element mounted on ~~to~~ an end of said flexure arm opposite said actuator arm, wherein said actuator arm assembly rotates about a second end of said actuator arm opposite said first end of said actuator arm, said read element reads from said disk and said write element writes to said disk;

wherein said read element has a read element skew angle and said write element has a write element skew angle, and

wherein at least one of said read element skew angle and said write element skew angle decreases as said read element and said write element move from said inner diameter to said outer diameter and is never ~~has a magnitude~~ less than 45 degrees while said read element and said write element are located over said data storage region.

2. (currently amended) A disk drive, as claimed in claim 1, wherein said data storage region has a plurality of concentric tracks which include sectors, said sectors

including data sectors and servo sectors, and ~~wherein~~ said servo sectors are written in a non-radially coherent manner by said write element due to said write element skew angle.

3. (currently amended) A disk drive, as claimed in claim 1, wherein said data storage region has a plurality of concentric tracks which include sectors, said sectors including data sectors and servo sectors, and ~~wherein~~ said servo sectors are printed on said ~~magnetic~~ disk ~~surface prior to assembly into said disk drive~~.

4. (currently amended) A disk drive, as claimed in claim 1, wherein at least one of said read element and said write element is mounted on said flexure arm such that at least one of said read element and said write element is not perpendicular to a centerline of said flexure arm, and said centerline of said flexure arm is parallel to a centerline of said actuator arm.

5. (currently amended) A disk drive, as claimed in claim 1, wherein at least one of said read element and said write element is mounted on said flexure arm such that at least one of said read element and said write element is perpendicular to a centerline of said flexure arm, and ~~an angle at which~~ said flexure arm is mounted on ~~to~~ said actuator arm such that said centerline of said flexure arm is not parallel to a centerline of said actuator arm~~is selected such that at least one of said read element skew angle and said write element skew angle is zero degrees when said read element and said write element are located off of said data storage region~~.

6. (currently amended) A disk drive, as claimed in claim 1, wherein at least one of said read element and said write element is mounted on said flexure arm such that at least one of said read element and said write element is perpendicular to a centerline of said flexure arm, and said flexure arm is mounted on said actuator arm such that said centerline of said flexure arm is parallel to a centerline of said actuator arm~~the length of said actuator arm assembly is selected such that at least one of said read element skew angle and said write element skew angle is zero degrees when said read element and said write element are located off of said data storage region~~.

7. (currently amended) A disk drive, comprising:

a magnetic disk having an annular data storage region extending from an inner diameter to an outer diameter; and

an actuator arm assembly including an actuator arm, a flexure arm mounted on ~~at at least a first non-zero angle to~~ a first end of said actuator arm at a non-zero angle relative to said actuator arm, and a read element and a write element mounted to an end of said flexure arm opposite said actuator arm at a 90 degree angle relative to said flexure arm, wherein said actuator arm assembly rotates about a second end of said actuator arm opposite said first end of said actuator arm, said read element reads from said disk and said write element writes to said disk,

wherein ~~at least one of said read element and said write element is mounted to said flexure arm such that the magnitude of~~ a skew angle of at least one of said read element and said write element relative to said data storage region decreases as said read

element and said write element move from said inner diameter to said outer diameter and is never less than 45 degrees ~~for any position~~ within said ~~the entire~~ data storage region.

8. (cancelled)

9. (currently amended) A disk drive, as claimed in claim 7, wherein ~~at least one of said read element and said write element is mounted to said flexure arm such that~~ said skew angle ~~of at least one of said read element and said write element~~ is greater than 60 degrees at said inner diameter~~for the entire data storage region~~.

10. (currently amended) A disk drive, as claimed in claim 7, wherein said data storage region includes a plurality of concentric tracks which include sectors, said sectors including data sectors and servo sectors, and ~~wherein~~ said servo sectors are written in a non-radially coherent manner by said write element due to said skew angle of said write element.

11. (currently amended) A disk drive, as claimed in claim 7, wherein said data storage region includes a plurality of concentric tracks which include sectors, said sectors including data sectors and servo sectors, and ~~wherein~~ said servo sectors are printed on said ~~magnetic~~ disk ~~surface prior to assembly into said disk drive~~.

12. (currently amended) A disk drive, as claimed in claim 7, wherein a tolerance of at least one of said read and write elements is increased by the inverse cosine of said skew angle ~~of at least one of said read element and said write element~~.

13. (currently amended) A disk drive, as claimed in claim 7, wherein an effective width of at least one of said read and write elements is increased by the inverse cosine of said skew angle ~~of at least one of said read element and said write element~~.

14. (original) A disk drive, as claimed in claim 7, wherein a signal-to-noise ratio produced by said read element is at least 6 dB.

15. (currently amended) A disk drive, as claimed in claim 7, wherein said data storage region includes a plurality of concentric ~~data~~ tracks, each of said ~~plurality of concentric data~~ tracks having a width associated therewith, and ~~wherein~~ the width of said ~~plurality of concentric data~~ tracks corresponds to the cosine of said skew angle of said write element~~head~~.

16. (currently amended) A disk drive, as claimed in claim 15, wherein said write element has a first width,

wherein the width of said ~~plurality of concentric data~~ tracks corresponds to the product of said first width and the cosine of said skew angle of said write element.

17. (currently amended) A disk drive, comprising:

a magnetic disk having an annular data storage region between inner and outer diameters; and

an actuator arm assembly including an actuator arm, a flexure arm mounted to a first end of said actuator arm, and a read element and a write element mounted to an end of said flexure arm opposite said actuator arm, wherein said actuator arm assembly rotates about a second end of said actuator arm opposite said first end of said actuator arm, said read element reads from said disk and said write element writes to said disk,

wherein ~~said flexure arm is mounted to said actuator arm such that the magnitude of~~ a skew angle of at least one of said read and write elements decreases as said read element and said write element move from said inner diameter to said outer diameter, is never less than 45 degrees while said read element and said write element are located ~~for any position~~ within said ~~the entire~~ data storage region and is zero degrees when said read element and said write element are located at a position off of said data storage region.

18. (currently amended) A disk drive, as claimed in claim 17, wherein at least one of said read element and said write element is mounted on said flexure arm such that at least one of said read element and said write element is perpendicular to a centerline of said flexure arm, and said flexure arm is mounted on ~~to~~ said actuator arm such that said centerline of said flexure arm is not parallel to a centerline of said actuator arm~~skew angle of at least one of said read and write elements is greater than 45 degrees for the entire data storage region~~.

19. (currently amended) A disk drive, as claimed in claim 17, wherein at least one of said read element and said write element is mounted on said flexure arm such that at least one of said read element and said write element is perpendicular to a centerline of said flexure arm, and said flexure arm is mounted on ~~to~~ said actuator arm such that said centerline of said flexure arm is parallel to a centerline of said actuator arm~~skew angle of at least one of said read and write elements is greater than 60 degrees for the entire data storage region~~.

20. (currently amended) A disk drive, as claimed in claim 17, wherein said data storage region includes a plurality of concentric ~~data~~ tracks which include sectors, said sectors including data sectors and servo sectors, and ~~wherein~~ said servo sectors are written in a non-radially coherent manner by said write element due to said skew angle of said write element.

21. (currently amended) A disk drive, as claimed in claim 17, wherein said data storage region includes a plurality of concentric ~~data~~ tracks which include sectors, said sectors including data sectors and servo sectors, and ~~wherein~~ said servo sectors are printed on said ~~magnetic~~ disk ~~surface prior to assembly into said disk drive~~.

22. (currently amended) A disk drive, as claimed in claim 17, wherein said read element has a first width and said write element has a second width, and ~~wherein~~ a tolerance of at least one of said first and second widths is increased by the inverse cosine of said skew angle ~~of at least one of said read and write elements~~.

23. (original) A disk drive, as claimed in claim 22, wherein a signal-to-noise ratio produced by said read element is at least 6 dB.

24. (currently amended) A disk drive, as claimed in claim 17, wherein said data storage region includes a plurality of concentric ~~data~~ tracks, and ~~wherein~~ the width of said ~~plurality of concentric data~~ tracks corresponds to the cosine of said skew angle of said write element.

25. (currently amended) A disk drive, as claimed in claim 17, wherein said read element has a first effective width and said write element has a second effective width, and at least one of said first and second effective widths is increased by the inverse cosine of said skew angle ~~of at least one of said read and write elements~~.

26. (currently amended) A ~~hard~~ disk drive, comprising:

a magnetic disk having an annular data storage region including a plurality of concentric ~~data~~ tracks between inner and outer diameters; and

an actuator arm assembly including an actuator arm, a flexure arm mounted on ~~to~~ a first end of said actuator arm, and a head mounted on ~~to~~ an end of said flexure arm opposite said actuator arm, said head having a read element and a write element, wherein said actuator arm assembly rotates about a second end of said actuator arm opposite said first end of said actuator arm, said read element reads from said disk and said write element writes to said disk,

10 wherein ~~the length of said actuator arm assembly is such that~~ a skew angle of said read element and write element relative to said ~~data~~ tracks ~~at said inner diameter of said data storage region~~ decreases as said head moves from said inner diameter to said outer diameter and is at least 60 degrees ~~greater~~ at said inner diameter and at least 20 degrees ~~than a skew angle~~ at said outer diameter ~~of said data storage region~~.

27. (currently amended) A disk drive, as claimed in claim 26, wherein said skew angle at said inner diameter ~~and said skew angle at said outer diameter of said data storage region~~ is at least 45 degrees~~degrees~~.

28. (cancelled)

29. (cancelled)

30. (currently amended) A disk drive, as claimed in claim 26, wherein said ~~plurality of concentric~~ tracks include sectors, said sectors including data sectors and servo sectors, and ~~wherein~~ said servo sectors are written in a non-radially coherent manner by said write element due to said skew angle.

31. (currently amended) A disk drive, as claimed in claim 26, wherein said ~~plurality of concentric~~ tracks include sectors, said sectors including data sectors and servo sectors, and ~~wherein~~ said servo sectors are printed on said ~~magnetic~~ disk ~~surface prior to assembly into said disk drive~~.

32. (currently amended) A disk drive, comprising:

a magnetic disk having a data storage region including a plurality of concentric ~~data~~ tracks between inner and outer diameters in which all data in said data storage region ~~on said disk recorded~~ is recorded, said ~~plurality of data~~ tracks having associated track widths; and

an actuator arm assembly including an actuator arm, a flexure arm mounted on ~~to~~ a first end of said actuator arm, and a head mounted on ~~to~~ an end of said flexure arm opposite said actuator arm, said head having a read element and a write element, wherein said actuator arm assembly rotates about a second end of said actuator arm opposite said first end of said actuator arm, said read element reads from said disk and said write element writes to said disk,

wherein the width of at least one of said write element and said read element is greater than said track width for each of said ~~plurality of concentric data~~ tracks, and

wherein a ~~the~~ skew angle of ~~at least a first of said read element and said write element~~ said head relative to said tracks decreases as said head moves from said inner diameter to said outer diameter and is not less than 45 degrees at said inner diameter ~~for each of said plurality of data tracks~~.

33. (currently amended) A disk drive, as claimed in claim 32, wherein said ~~plurality of concentric~~ tracks include sectors, said sectors including data sectors and servo sectors, and ~~wherein~~ said servo sectors are written in a non-radially coherent manner by said write element due to said skew angle.

34. (currently amended) A disk drive, as claimed in claim 32, wherein said ~~plurality of concentric~~ tracks include sectors, said sectors including data sectors and servo sectors, and ~~wherein~~ said servo sectors are printed on said ~~magnetic~~ disk ~~surface prior to assembly into said disk drive~~.

35. (original) A disk drive, as claimed in claim 32, wherein said head is mounted on said flexure arm such that at least one of said read element and said write element is not perpendicular to a centerline of said flexure arm.

36. (currently amended) A disk drive, as claimed in claim 32, ~~35,~~ wherein ~~an angle at which said head is mounted to said flexure arm is selected such that a~~ said skew angle ~~of said read and write elements relative to said data tracks~~ is zero degrees when said head is located at a position off of said data storage region.

37. (cancelled)

38. (cancelled)

39. (currently amended) A disk drive, as claimed in claim 32, ~~35,~~ wherein said ~~head is mounted to said flexure arm such that a~~ skew angle is greater than 60 degrees at said inner diameter~~for each of said plurality of concentric data tracks~~.

40. (currently amended) A disk drive, as claimed in claim 32, wherein said head is mounted on said flexure arm such that said head is not perpendicular to a centerline of said flexure arm, and said flexure arm is mounted on said actuator arm such that said centerline of said flexure arm is parallel to a centerline of said actuator arm~~the length of said actuator arm assembly is selected such that a skew angle of said read and write elements relative to said data tracks is zero degrees when said head is located off of said data storage region~~.

41. (currently amended) A disk drive, as claimed in claim 32, wherein said head is mounted on said flexure arm such said head is perpendicular to a centerline of said flexure arm, and ~~an angle at which~~ said flexure arm is mounted on said actuator arm such that said centerline of said flexure arm is not parallel to a centerline of said actuator arm~~is selected such that a skew angle of said read and write elements is zero degrees when said head is located off of said data storage region~~.

42. (cancelled)

43. (cancelled)

44. (currently amended) A disk drive, as claimed in claim 41, wherein said head is mounted on said flexure arm such said head is perpendicular to a centerline of said flexure arm, and said flexure arm is mounted on ~~to~~ said actuator arm such that said

centerline of said flexure arm is parallel to a centerline of said actuator arm~~said skew angle is greater than 60 degrees for each of said plurality of concentric data tracks~~.

45. (currently amended) A method for increasing the tolerance of a read element in a disk drive, comprising:

providing a head having said read element that reads from a magnetic disk, said read element having a nominal width and a width tolerance; and

skewing said read element to a skew angle of 45 degrees or more at each ~~data~~ track located in a data storage region of said ~~a magnetic~~ disk ~~surface~~ such that said width tolerance is increased by approximately the inverse cosine of said skew angle, wherein said skew angle decreases as said head moves from an inner diameter to an outer diameter of said disk.

46. (previously presented) A method, as claimed in claim 45, wherein said skewing step includes:

selecting said skew angle such that said width tolerance is increased by at least 30 percent.

47. (currently amended) A method, as claimed in claim 45, wherein said skewing step includes:

selecting said ~~a~~ skew angle such that said width tolerance is increased by at least 50 percent.

48. (currently amended) A method, as claimed in claim 45, wherein said skewing step includes:

selecting said ~~a~~ skew angle such that said width tolerance is increased by at least 100 percent.

49. (currently amended) A method for increasing ~~physical~~ head element physical widths in a disk drive, said disk drive having a data storage region with a radial extent between inner and outer diameters, comprising:

providing a head having a read element having a first physical width and a write element having a second physical width, wherein said read element reads from said data storage region and said write element writes to said data storage region; and

skewing said head at a skew angle of 45 degrees or more ~~at each position~~ throughout the radial extent of the data storage region, such that said read element has a first effective width and said write element has a second effective width, wherein said first and second effective widths are reduced compared to said first and second physical widths and said skew angle is increased as said head moves from said outer diameter to said inner diameter.

50. (original) A method, as claimed in claim 49, further comprising:

reducing a track width to correspond to said first and second effective widths.

51. (currently amended) A method, as claimed in claim 49, wherein said skewing step includes:

selecting said ~~a~~ skew angle such that said first and second effective widths are 70 percent of said first and second physical widths.

52. (currently amended) A method, as claimed in claim 51, wherein said skewing step includes:

selecting said ~~a~~ skew angle such that said first and second effective widths are 60 percent of said first and second physical widths.

53. (currently amended) A method, as claimed in claim 49, wherein said skewing step includes:

selecting said ~~a~~ skew angle such that said first and second effective widths are 50 percent of said first and second physical widths.

54. (currently amended) A method for decreasing track widths on magnetic media in a disk drive, comprising:

providing a head having an element for reading from or writing to tracks located in a data storage region of said magnetic media between inner and outer diameters of said magnetic media, said element having a nominal width;

skewing said element to a skew angle of 45 degrees or more relative to each ~~data~~ track ~~located in a data storage region of said magnetic media~~ such that an effective width of said element relative to said ~~data~~ tracks is reduced as compared to said nominal width and said skew angle is increased as said head moves from said outer diameter to said inner diameter; and

selecting a track width of said ~~data~~ tracks to correspond to said effective width.

55. (original) A method, as claimed in claim 54, further comprising:

selecting said skew angle such that said track width is narrower than said nominal width.

56. (original) A method, as claimed in claim 54, wherein said selecting step includes:

reducing said track width relative to a nominal track width which corresponds to said nominal width.

57. (original) A method, as claimed in claim 56, wherein said reducing step includes:

reducing said track width by at least 30 percent.

58. (original) A method, as claimed in claim 56, wherein said reducing step includes:

reducing said track width by at least 40 percent.

59. (original) A method, as claimed in claim 56, wherein said reducing step includes:

reducing said track width by at least 50 percent.

60. (currently amended) A disk drive, ~~drive~~ as claimed in claim 1, ~~1~~ wherein said read element and said write element are located on a head which ~~and wherein said head~~ is substantially rectangular in shape.

61. (currently amended) A disk drive, ~~drive~~ as claimed in claim 7, ~~7~~ wherein said read element and said write element are located on a head which ~~and wherein said head~~ is substantially rectangular in shape.

62. (currently amended) A disk drive, ~~drive~~ as claimed in claim 17, ~~17~~ wherein said read element and said write element are located on a head which ~~and wherein said head~~ is substantially rectangular in shape.

63. (currently amended) A ~~hard~~ disk drive, ~~drive~~ as claimed in claim 26, ~~26 wherein said read element and said write element are located on a head and~~ wherein said head is substantially rectangular in shape.

64. (currently amended) A disk drive, ~~drive~~ as claimed in claim 32, ~~32 wherein said read element and said write element are located on a head and~~ wherein said head is substantially rectangular in shape.

65. (currently amended) A method, ~~method~~ as claimed in claim 45, ~~45~~ wherein said ~~said step of providing a head comprises providing a~~ head ~~which~~ is substantially rectangular in shape.

66. (currently amended) A method, ~~method~~ as claimed in claim 49, ~~49~~ wherein said ~~step of providing a head comprises providing a~~ head ~~which~~ is substantially rectangular in shape.

67. (currently amended) A method, ~~method~~ as claimed in claim 54, ~~54~~ wherein said ~~step of providing a head comprises providing a~~ head ~~which~~ is substantially rectangular in shape.

68. (new) A disk drive, comprising:

a magnetic disk including concentric tracks and inner and outer diameters; and

an actuator arm assembly including an actuator arm, a flexure arm mounted on a first end of said actuator arm, and a head mounted on an end of said flexure arm opposite said actuator arm, said head having a read element and a write element, wherein said actuator arm assembly rotates about a second end of said actuator arm opposite said first end of said actuator arm, said read element reads from said disk and said write element writes to said disk,

wherein a skew angle of said head relative to said tracks decreases as said head moves from said inner diameter to said outer diameter, thereby increasing the effective widths of said read and write elements relative to the physical widths of said read and write elements as said head moves from said inner diameter to said outer diameter, and said skew angle is at least 45 degrees at said inner diameter and at least 20 degrees at said outer diameter.

69. (new) A disk drive, as claimed in claim 68, wherein said skew angle is at least 60 degrees at said inner diameter.

70. (new) A disk drive, as claimed in claim 68, wherein said skew angle is at least 45 degrees at said outer diameter.

71. (new) A disk drive, as claimed in claim 68, wherein said skew angle is at least 60 degrees at said inner diameter and at least 45 degrees at said outer diameter.

72. (new) A disk drive, as claimed in claim 68, wherein said skew angle is approximately 65 degrees at said inner diameter and approximately 45 degrees at said outer diameter.

73. (new) A disk drive, as claimed in claim 68, wherein said skew angle is approximately 60 degrees at said inner diameter and approximately 20 degrees at said outer diameter.

74. (new) A disk drive, as claimed in claim 68, wherein said physical widths are at least double said effective widths at said inner diameter.

75. (new) A disk drive, as claimed in claim 68, wherein said head is mounted on said flexure arm such that said head is not perpendicular to a centerline of said flexure

arm, and said flexure arm is mounted on said actuator arm such that said centerline of said flexure arm is parallel to a centerline of said actuator arm.

76. (new) A disk drive, as claimed in claim 68, wherein said head is mounted on said flexure arm such said head is perpendicular to a centerline of said flexure arm, and said flexure arm is mounted on said actuator arm such that said centerline of said flexure arm is not parallel to a centerline of said actuator arm.

77. (new) A disk drive, as claimed in claim 68, wherein said head is mounted on said flexure arm such said head is perpendicular to a centerline of said flexure arm, and said flexure arm is mounted on said actuator arm such that said centerline of said flexure arm is parallel to a centerline of said actuator arm.